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Edward G. Gladeau
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IPP

File No. 32.0408

INTERMOUNTAIN POWER PROJECT
A DEVELOPMENT OF INTERMOUNTAIN POWER AGENCY

October 14, 1983

Mr. Brent C. Bradford
Executive Secretary
Utah Air Conservation Committee
150 West North Temple
Salt Lake City, Utah 84110

Dear Mr. Bradford:

Reply to Comments Presented at the September 26, 1983 Hearing on the Intermountain Power Project (IPP)

On September 26, 1983, the Department of Health (DOH) held a hearing concerning the notice of intent to approve contruction modifications for the Intermountain Generating Station (IGS). As you know, IPP has submitted detailed information, including numerous technical reports, on each of the issues that are pertinent to this proceeding. In this letter, IPP does not intend to restate its entire case or to respond to all arguments made at the September 26 hearing (the record already responds to most of the concerns raised at the hearing); however, IPP does want to respond here to Mr. Sherman Young's arguments concerning (1) whether selective catalytic reduction (SCR) is a demonstrated technology; (2) whether the costs of retrofitting SCR at the IGS units have been overstated; and (3) whether the benefits associated with retrofitting SCR outweigh the costs.

1. SCR is Not a Demonstrated Technology

IPP has submitted extensive data demonstrating that the SCR process has not been applied to any large power plant in the United States. While there have been applications in Japan, the process has not been demonstrated on any coal-fired power plant similar to IGS. There is no experience on a baghouse-equipped plant, and serious technical questions have been raised about reliable baghouse operations on an SCR-equipped plant. Even more important, the catalyst poisons contained in Utah bituminous coals could preclude reliable SCR operation and substantially reduce process availability. In short, the SCR process has not been developed to the point where, if applied to the IGS units, there is any certainty that it could achieve reliable, continuous reduction in NOx emissions or operate without jeopardizing other needed control equipment.

Project Manager/Department of Water and Power City of Los Angeles
111 North Hope Street, Los Angeles, California/Mailing Address: P.O. Box 111-Room 931 Los Angeles, California 90051

Mr. Young, however, concludes, based on what he describes as the "Japanese experience", that SCR is a demonstrated technology. To support this contention, he stated that "28 Japanese coal-fired power plants are either currently using SCR or will be using SCR technology at the time that IPP goes on line in June 1986." Additionally, Mr. Young referred to SCR experience at the Mitchell plant in Georgia to support his position.

An October 12, 1983 letter from KVB's Mr. Lowell Smith to IPP's Mr. James H. Anthony (a copy of which is enclosed), clarifies some of the information presented in Mr. Young's comment. Specifically, the KVB letter explains that before SCR can, with reasonable assurance, be held out as a demonstrated technology for a plant like IGS, that technology must meet four important criteria.

First, the SCR technology should be shown to have a demonstrated catalyst life in excess of two years and, in IPP's case, the demonstration should be on a coal with the catalyst poisoning elements which are contained in Utah bituminous coal. Second, there should be a demonstration of NOx removal efficiency equal to or in excess of 80% for a minimum of two years. Third, the SCR system should be shown to have operated in a power plant with the base-loading characteristics of IGS and in the size range of the IGS units. At a minimum, the plant should not be smaller than 100 MWe. Finally, SCR should be shown to be capable of operating in a high-dust loading environment similar to that experienced with a baghouse particulate collector; the SCR system should also be a full stream high-dust application to assess the impact on the air preheater plugging potential. Unless these minimum criteria are met, installation of an SCR system on IPP could jeopardize the reliability and availability of that single-source electric generating system.

Mr. Young implied that 28 SCR applications on Japanese utility boilers -- only a portion of which are presently operating -- were enough to consider SCR as demonstrated technology at IPP. Review of the data presented in Mr. Young's comments, as well as data presented in IPP's June 22, 1983 submittal, shows that 25 of the 28 plants cited by Mr. Young are operating at less than 80%-removal efficiency or either have extremely short operating experience (months) or do not operate in a high-dust loading environment. The other three units -- Takehara Units 1 and 3, and Tomato-Atsuma Unit 1 -- are designed to operate at 80% NOx removal; however, none of them are high-dust loading application -- all incorporate hot-side precipitators.

Mr. Young also mentioned the experience at Georgia Power Company's Mitchell plant, implying that an Environmental Protection Agency (EPA) program showed a 90%-removal efficiency, and implying that this is additional support for considering SCR to be best available control technology (BACT). The facts, however, show that the Mitchell plant experience does not support SCR installation at IGS. The Mitchell plant tests were on a 0.5-MW slipstream -- 1600 times smaller than IGS. This could hardly be considered adequate to demonstrate viability on units the size of the IGS units. Also, the objective of the Mitchell program was to demonstrate 90 days of operation at the 90%-removal efficiency, not the two years of operation on which IPP based its economics. EPA noted this fact at the end of the Mitchell study, saying that "it is uncertain that the SCR system could operate for one year at this level without the use of additional catalyst." It should also be pointed out that, at Mitchell, EPA further concluded "that the difference between the properties of Japanese and U.S. coals points out the need for SCR test when considering SCR process applications for untested coals."

In short, as the KVB letter makes plain, neither the Japanese experience nor Mitchell plant study supports a conclusion that SCR would be the BACT for the IPP units.

2. The Cost of Retrofitting SCR at IGS is Excessive

Even if SCR could operate reliably without harmful side effects on other equipment, it would be extremely costly to retrofit SCR at IGS -- either now or sometime after plant start-up. Black & Veatch, experts in the area, who have calculated the cost of retrofitting SCR at IGS, estimate that the cost of installing SCR before commercial operation of IGS is $1.694 billion (in 1986 dollars), and the cost of retrofitting SCR after plant start-up is $1.255 billion (in 1986 dollars).1/ The Black & Veatch cost estimate of $1.255 billion is the most comprehensive and reliable cost estimate available for retrofitting SCR on IGS; however, it is probably unrealistically low as a result of the assumption that the SCR system will have no adverse impact on plant availability. Experience has shown that this type of first-of-a-kind application of a developing technology would be

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1/The IPP and DOH cost estimates are equivalent. For example, the IPP estimate of a retrofit cost of $1.255 billion in 1986 dollars is equal to the DOH cost estimate of $893 million in 1983 dollars.

expected to have severe reliability and availability penalties, especially on a plant such as IGS that is to be relied upon for base-load operation. As we have indicated in our letter of April 13, 1983, from Mr. James H. Anthony to Mr. Brent C. Bradford, a cost of approximately $400 million in replacement power would result from each percent of time that the IGS generating units are unavailable.

Mr. Young, however, argues that it would not be so costly to install SCR at IGS. He argues first that the Black & Veatch calculations are inaccurate and too high.2/ As noted above, however, the Black & Veatch cost estimate is the most comprehensive and reliable estimate available and, it is, if anything, too low. Mr. Young's cost estimates, on the other hand, are based on more general studies and suppliers' claims.3/ We believe that the IPP/DOH estimates are based on the best data available and we stand by them.

Mr. Young also argues, based on a table in the DOH Engineering Review - Summary, that it is less costly to retrofit SCR than to install scrubbers. The data in that table is incorrect and misleading. Valid cost estimates reveal that installing scrubbers leads to a cost of $1,260.

2/Mr. Young tries to discredit Black & Veatch's cost estimate by claiming that Black & Veatch first said it would cost $2.04 billion to retrofit SCR and later reduced its estimate to $1.25 billion. Black & Veatch, did in fact, first estimate that it would cost $2.04 billion to retrofit SCR before commercial operation of IGS and then later refined that estimate to $1.694 billion. The $1.25 billion Black & Veatch estimate refers to the cost of retrofitting SCR after start-up of IGS.

3/Also, Mr. Young's estimates ignore the delay or outage costs involved in retrofitting SCR at IGS. As we have pointed out in previous submittals, Utah and federal law and numerous judicial decisions, however, make it clear that the BACT review for IGS must take into account the entire cost of applying a particular technology which includes, in this case, the project delay costs associated with making plant design modifications at this point.

(levelized 1986 dollars) per ton of SO_2 removed;4/ whereas, installing SCR would lead to costs of approximately $10,980 per ton of NOx removed.5/ In short, the figures show that it is not cost-effective to install SCR.

3. The Costs of Installing SCR Far Outweigh the Benefits

It is appropriate in a BACT review to determine the net environmental impact and costs associated with each emission control system being evaluated (EPA, "Guidelines for Determining Best Available Control Technology (BACT)" [December 1978] at p. 11). The record in this case contains such an analysis for the control systems now authorized for IGS. The record shows that there will be no adverse environmental impacts associated with IGS' operating at the currently permitted emission levels. Specifically, emissions from IGS will not interfere with the attainment or maintenance of any federal ambient air quality standards -- standards designed to protect the public health with a margin of safety and to protect the public welfare. Indeed, as required by state and federal law, IGS will increase ambient levels of the pollutants emitted by only a small percentage of those standards.

Mr. Young's final argument, however, is that there are environmental costs associated with IGS' failure to retrofit SCR and that those costs outweigh the cost of SCR installation. In particular, Mr. Young argues that failure to install SCR at IGS will result in such costs due to adverse effects on human health and tourism and to other problems allegedly caused by acidic deposition.

4/This number is derived from information in the Black & Veatch memo, Attachment 7 to the July 15, 1983 letter from Mr. Anthony to Mr. Bradford. The figure is based on 46,400 tons/year removal calculated on average sulfur coal content.

5/This estimate is based on data in the Black & Veatch report, Enclosure 2 with Mr. Anthony's June 22, 1983 letter to Mr. Bradford, and is based on the assumptions that any SCR retrofit would start during a scheduled maintenance outage, that SCR will achieve 80%-NOx removal, that actual NOx emissions will average 65% of the permit limit of 0.55 lbs. per million Btu, and that the SCR system will be 100% reliable and not adversely affect the plant capacity factor of 72.1%.

Mr. Young's arguments on these points defy logic and are without merit. In each case, Mr. Young assumes the existence of high levels of NO_2, attributes such concentrations entirely to IGS' emissions, and then predicts adverse impacts from the IGS emissions. In fact, IGS' contribution to NO_2 levels in the populated areas of concern to Mr. Young are miniscule -- less than a maximum one-tenth of one percent of background levels. Thus, such impacts will have virtually no impact on public health, tourism or agriculture in Utah. We respond briefly to Mr. Young's specific arguments below.

Mr. Young argues that concentrations of NO_2 above 190 micrograms/m^3 may affect highly susceptible parts of the population. He then notes that since, under current law, annual NOx concentrations from IPP are not to exceed 0.05 ppm 100 micrograms/m^3 annual arithmetic mean,6/ it is "reasonable to assume" (1) that IPP will, in fact, have annual impacts in the range of 100 micrograms/m^3 and cause peak NOx concentrations of 190 micrograms/m^3; (2) that an area of high population density (500,000 people) will be exposed to those NOx emissions from IPP, and (3) that each 250 of those 500,000 "exposed" people will be adversely affected by the NOx emissions, which will result in significant costs to the public.

Mr. Young's conclusions are based on invalid assumptions and are completely without foundation. First, there is no basis for Mr. Young's assumption of adverse health effects at 190 micrograms/m^3. Based on a highly conservative interpretation of the available health literature, EPA's staff tentatively concluded that infrequent exposures to 1-hour-average NO_2 concentrations, even as high as 566 micrograms/m^3, should "present minimal health risks to children and other sensitive population groups" (EPA's Draft Staff Paper at 51).

6/Mr. Young's statement says 0.05 micrograms/meter^3; we assume that he meant 0.05 ppm or 100 micrograms/meter^3.

Even if, as Mr. Young suggests, the peak short-term NO_2 concentration is twice the peak annual concentration, the maximum short-term NO concentration attributable to IGS emissions would be only 8.6 micrograms per cubic meter7/ -- less than 5% of the level at which Mr. Young says there may be adverse health effects. Moreover, such "peak" impacts would occur, if at all, far from the major population centers about which Mr. Young is concerned.

Mr. Young's arguments about tourism and agriculture are similarly flawed. As to tourism, Mr. Young argues that IPP's NOx emissions will result in large scale discoloring hazy air masses, and he then arbitrarily assumes that will reduce tourism in Utah by 5%, costing Utah $3.5 billion over the 35-year life of IGS. The record data once again shows that Mr. Young's guesses and assumptions are wrong. An H. E. Cramer evaluation of visibility, described in the Bowers letter, evaluates the visibility impact of emissions from IGS at the nearest existing and potential Class I (pristine air quality) areas in Utah. The analysis (based on the conservative assumption that IPP would be building four units instead of the two it is building) shows that there will be no detectable discolorations or reductions in the visual range attributable to the IGS emissions. Thus, there is no basis for assuming that IGS will produce any reduction in Utah tourism.

Mr. Young's final concerns deal primarily with acidic deposition and his fears that IPP's NOx emissions will in some way exacerbate acidic deposition problems -- particularly in the sensitive areas of the Wasatch Mountains. There is no basis for concern that IGS will perceptibly affect the acidity of rain. As the record clearly shows, for example, the sensitive areas of the Wasatch Mountains are 100 miles or more from IGS. Even if such emissions were to reach the Mountains, which is unlikely, their impact would be minimal. Studies conducted in the Wasatch Mountains and summarized by Environmental Research and Technology, Inc.'s Dr. Hidy indicate that, although the Salt Lake City and Provo metropolitan areas (which are relatively near the Mountains) have grown significantly

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7/The record shows that the calculated maximum annual average ground-level NO_2 concentration attributable to emissions from IGS is 4.3 micrograms per cubic meter, occurring 7.1 kilometers north-northeast of the IGS stack -- far from any population center. See July 1, 1983 letter from James F. Bowers to James H. Anthony (hereinafter the Bowers letter).

since the 1950s, there is no evidence that increased NOx emissions from those Cities' major mobile and stationary sources have caused any changes in the acidity or nitrate concentrations in the Wasatch Mountains. If such nearby major sources of NOx loadings have no measurable impact, then any increases in current NOx levels (in the range of 0.8%) due to the far distant IGS cannot be viewed as posing any significant threat of increased acidification.

In summary, IPP's NOx emissions will not adversely affect public health in Utah, nor will it have any discernible impact on Utah tourism or agriculture.

If you or your staff require any additional information, please contact Mr. Roger T. Pelote at (213) 481-3412.

Sincerely,

JAMES H. ANTHONY
Project Director
Intermountain Power Project

RTP:glh

Enclosure

cc: Mr. D. Kircher w/Enclosure
EPA Region VIII
1860 Lincoln Street
Denver, Colorado 80295

Mr. Roger T. Pelote w/Enclosure

See attached list

bcc: Mr. Henry V. Nickel w/Enclosure
Hunton & Williams
1919 Pennsylvania Avenue, N.W.
Washington, D.C. 20036

Mr. James A. Holtkamp w/Enclosure
Van Cott, Bagley, Cornwall & McCarthy
Suite 1600
50 South Main Street
Salt Lake City, Utah 84144

Mr. Lowell L. Smith w/Enclosure
Manager, Western Engineering Division
KVB
P.O. Box 19518
Irvine, California 92714

Mr. Donald O. Swenson w/Enclosure
Project Air Pollution Control Systems Engineer
Black and Veatch Consulting Engineers
P.O. Box 8405
Kansas City, Missouri 64114

Mr. Ronald L. Rencher w/Enclosure
~~Acting~~ General Manager
Intermountain Power Agency
The Atrium, Suite 101
5250 South 300 West
Murray, Utah 84107

Note: 11/8/83, Nancy suggested me that Rencher is now the GM

Ms. Ann Garnett w/Enclosure
Public Affairs Manager
Intermountain Power Agency
The Atrium, Suite 101
5250 South 300 West
Murray, Utah 84107

D. W. Waters
D. Hyska
J. H. Anthony w/Enc.
V. L. Pruett
R. L. Nelson w/Enc.
B. Campbell w/Enc.
IPP File w/Enc.
Robert C. Burt
Patrick P. Wong
A. S. Buchanan
E. N. Friesen
S. R. Seid
J. J. Carnevale w/Enc.
N. F. Bassin w/Enc.
R. E. Gentner w/Enc.
D. W. Fowler w/Enc.
D. J. Waters w/Enc.
Eldon A. Cotton
✓Edward G. Gladbach w/Enc.